

# Open Research Online

---

The Open University's repository of research publications and other research outputs

## Monitoring and prediction of land use land cover changes in a hotspot mining landscape in Ghana

### Other

#### How to cite:

Obodai, Jacob (2021). Monitoring and prediction of land use land cover changes in a hotspot mining landscape in Ghana. Postgraduate Research Poster Competition, The Open University.

For guidance on citations see [FAQs](#).

© 2021 Jacob Obodai



<https://creativecommons.org/licenses/by/4.0/>

Version: Poster

---

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

---

[oro.open.ac.uk](https://oro.open.ac.uk)



# MONITORING AND PREDICTION OF LAND USE LAND COVER CHANGES IN A HOTSPOT MINING LANDSCAPE IN GHANA.

Jacob Obodai, Geography, FASS. The Open University. Email: [jacob.Obodai@open.ac.uk](mailto:jacob.Obodai@open.ac.uk)  
Supervisors: Dr Shonil Bhagwat and Prof. Giles Mohan



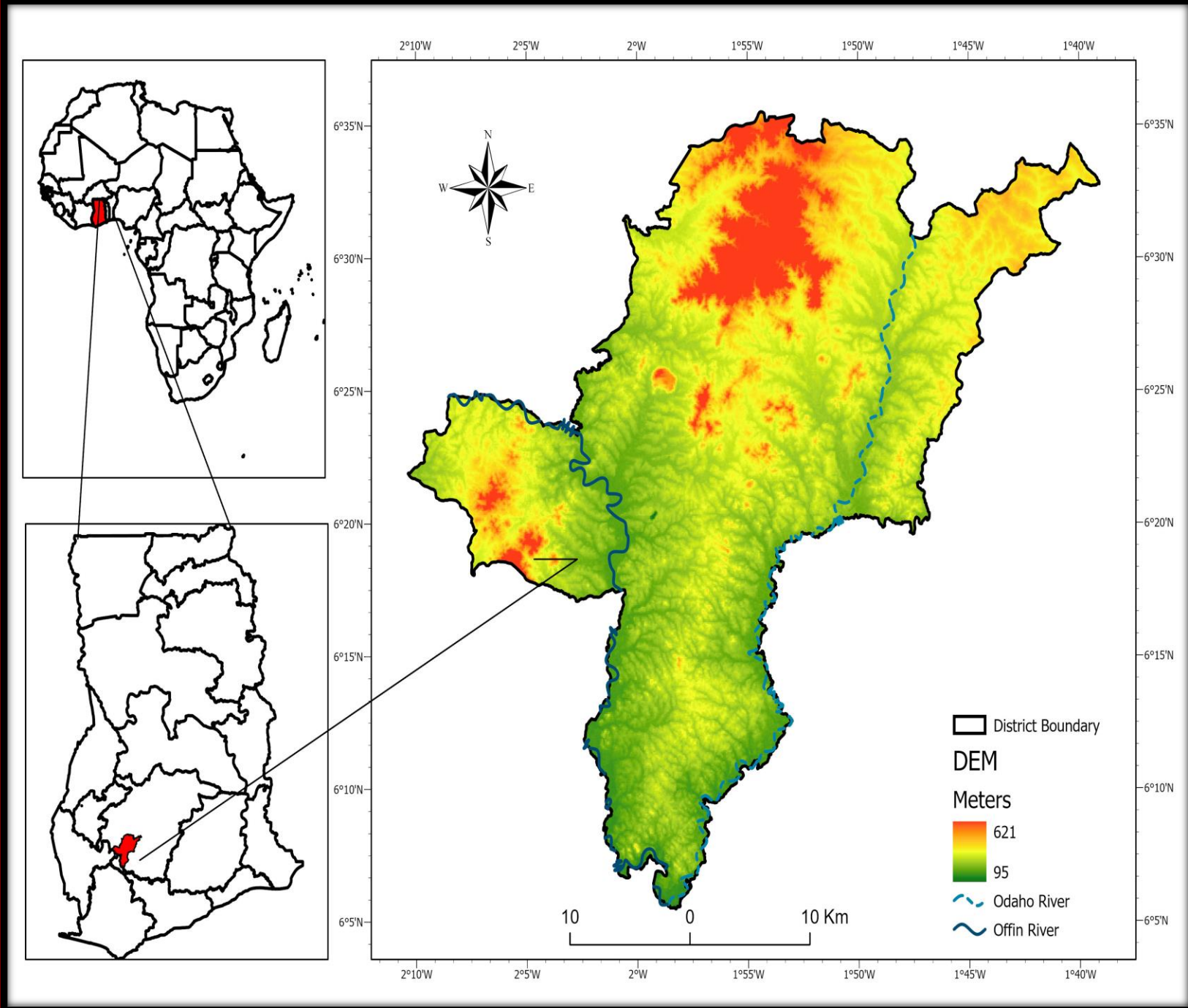
## INTRODUCTION

- The operations of both large and small-scale mining impacts on existing land use and land cover (LULC) and poses great threat to humans and their environment
- Analysis of the historical trends and rates of current and future LULC changes are crucial in the sustainable planning and management of natural resources.

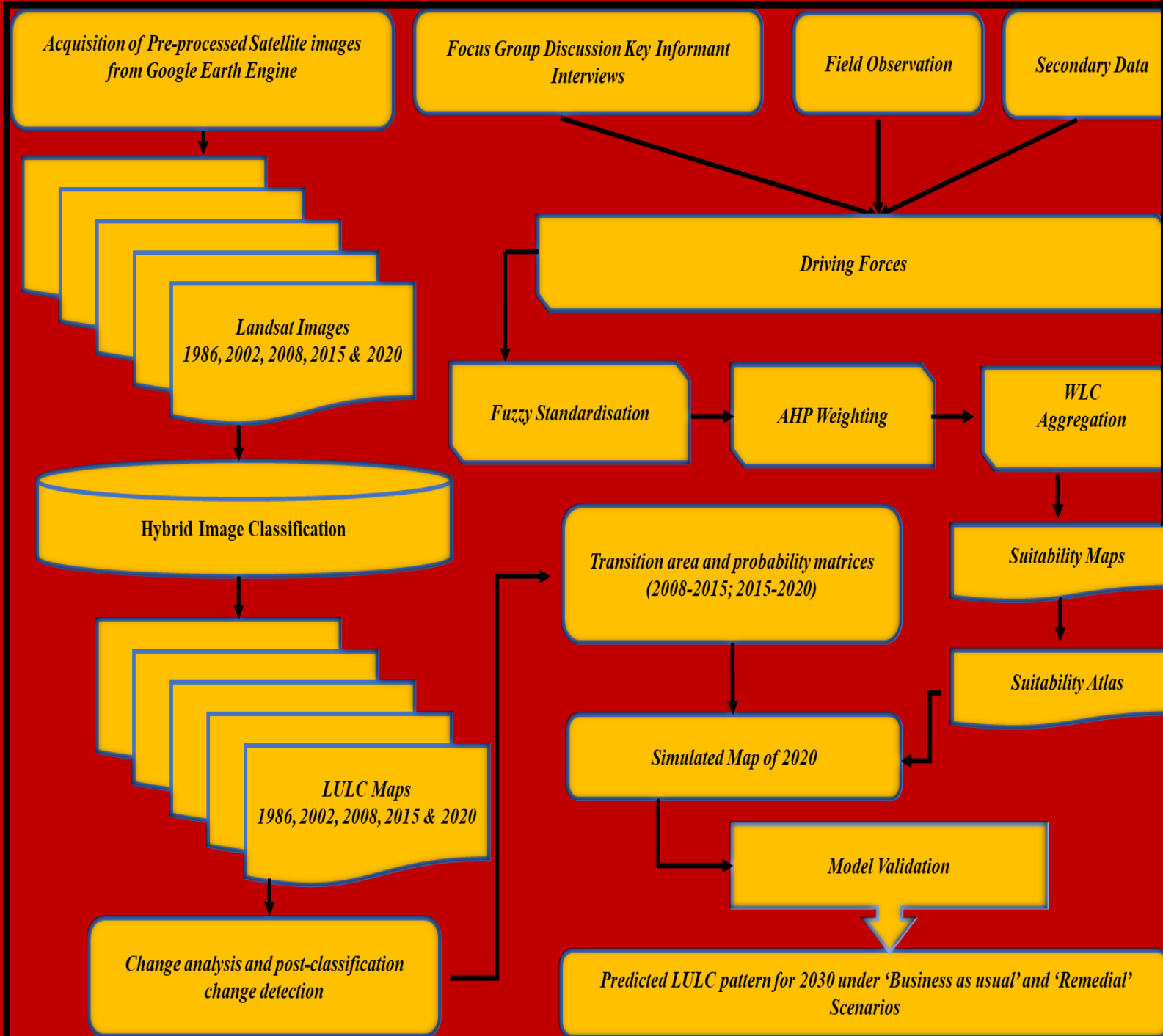


Small-scale mining operations in Ghana

## GEOGRAPHICAL CONTEXT



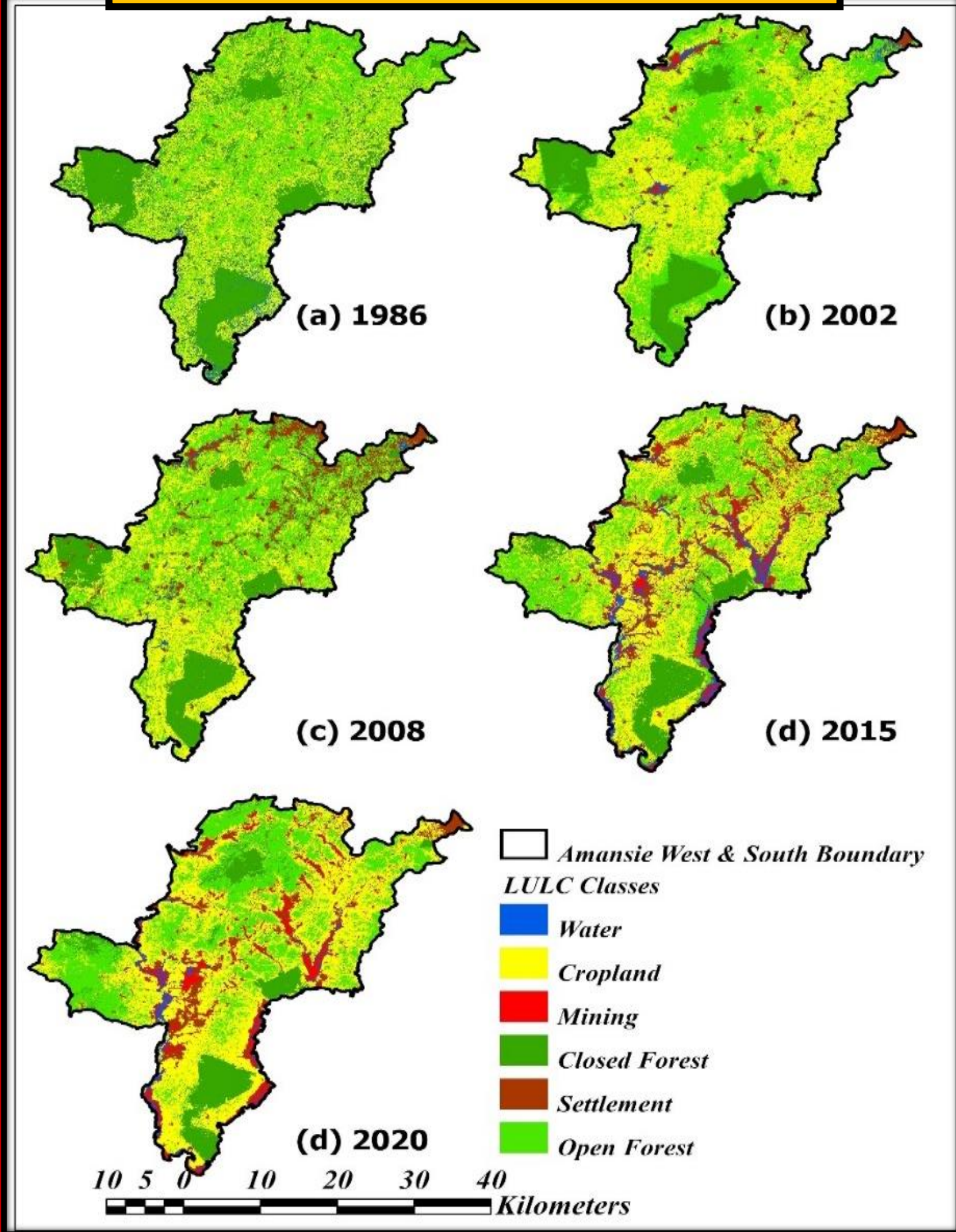
## STUDY METHODOLOGY



## Participant Observations/Interactions



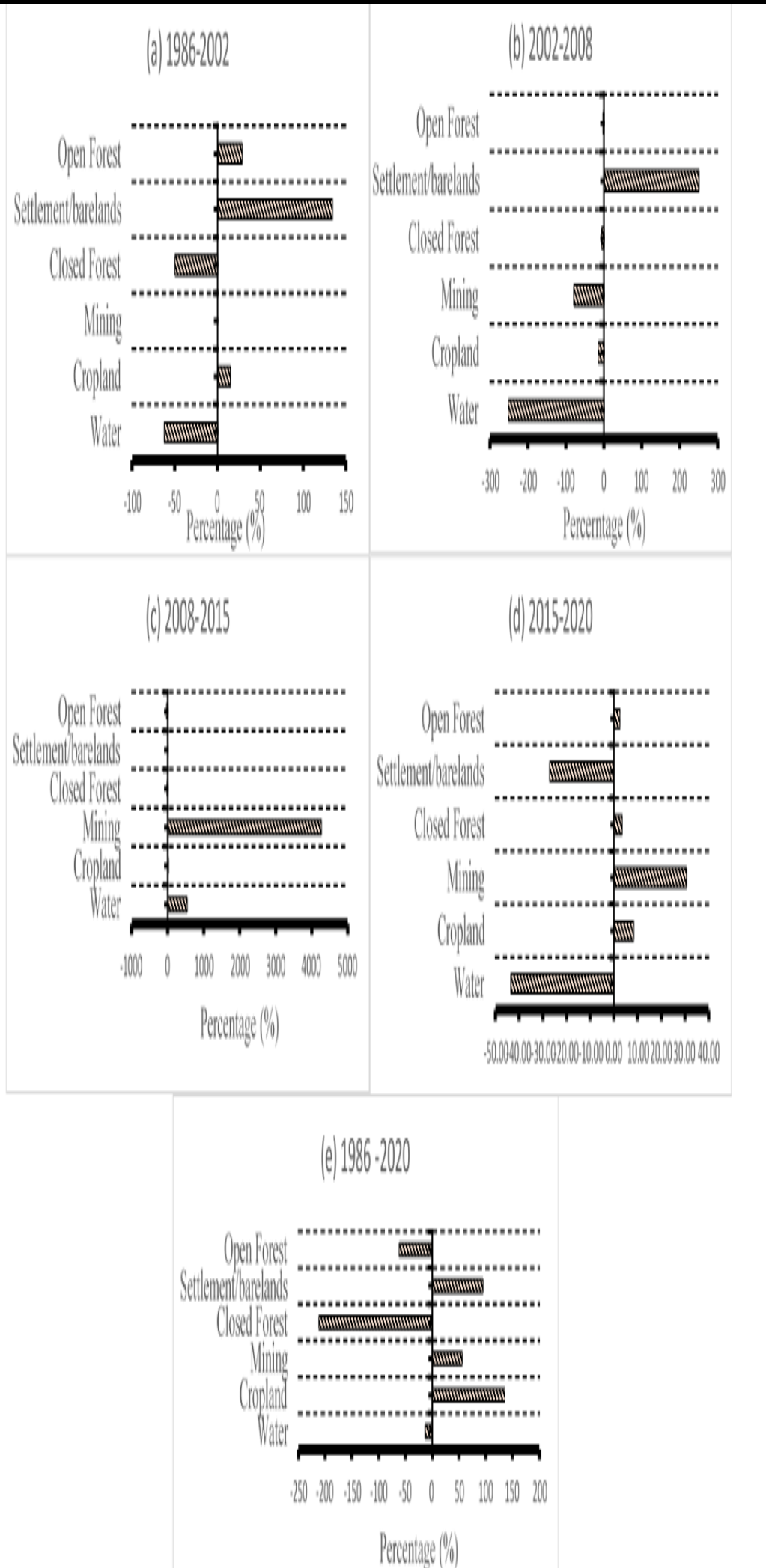
## LULC Classifications



## RESULTS

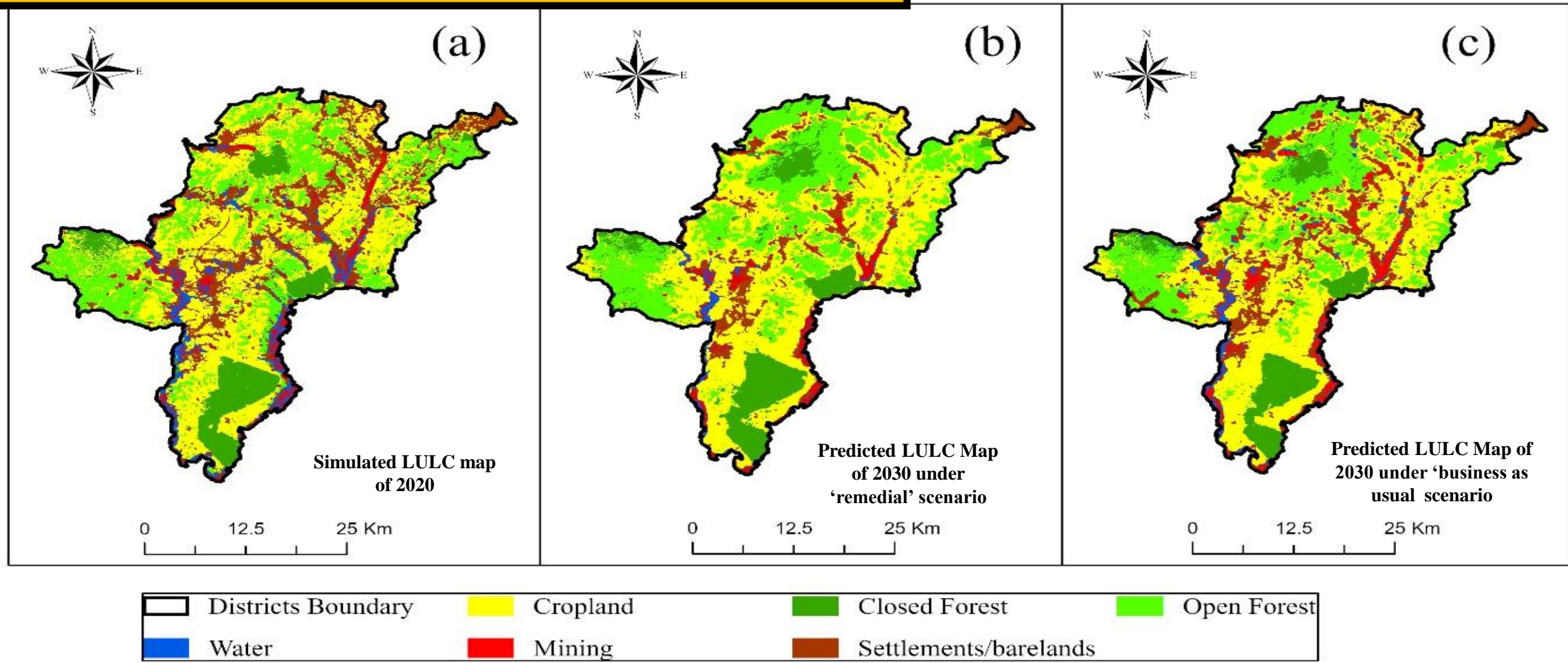
- Four unique epochs of LULC dynamics in relation to mining:
  - Invisible mining footprints (1986 map);
  - Visible mining footprints (2002 map);
  - Radical mining footprints (2008 & 2015 maps), and
  - Contracted mining footprints (2020 map)
- The net area of change in mining from 1986 to 2020 was an increase of 5,589 ha
- A total forest cover lost of 27,333ha (36%) at an average annual deforestation rate of 1.07% from 1986 to 2020
- Increased cropland of 13,593 ha from 1986 to 2020 in favour of perennial cash crops such cocoa and palm plantations

## % Changes in LULC Classes



- Projected increase in mining (599 ha) and water (1,409 ha), and a decrease in croplands (1,549 ha) and closed forests (712 ha) in 2030 under the Business as usual scenario.
- Projected decline in water (1,019 ha) and mining (663ha), and increases (1,162 ha) in open forests and closed forests (1,990 ha)

## Simulated and Predicted Maps of 2030



## CONCLUSIONS

- Mining is intricately related to all the LULC classes, and significantly drives the observed LULC changes
- The CA-Markov model successfully predicted the future LULC changes under 'business as usual' and 'remedial' scenarios.
- The integration of remote sensing/GIS and ethnographic methods in understanding LULC changes offer elaborate and robust insights into LULC dynamics compared to using either RS/GIS or ethnographic approaches